GAMING SYSTEMS

FIELD OF THE INVENTION

The present invention relates to gaming systems such as those incorporating gaming machines including slot machines, poker machines, keno machines and others. The invention also relates to internet gaming using personal computers and other devices.

BACKGROUND OF THE INVENTION

The present invention is particularly relevant to jackpot gaming systems in which a number of electric gaming machines (EGM's) are networked. These gaming systems can be externally triggered promotional jackpots, EGM triggered jackpots and externally triggered regulatory jackpots.

EGM triggered jackpots require EGM's specifically made for this purpose. Accordingly a club wishing to offer this facility with their EGMs must purchase new ones that offer this feature. All EGMs participating in a linked jackpot of this type typically must be of the same type, e.g. manufacturer and game. Furthermore they tend to have a relatively limited configurability in terms of prize values, return to player, number of levels and themes.

In contrast to the EGM triggered jackpots, externally triggered jackpots have a much greater degree of flexibility and therefore attractiveness to gaming venues.

In many jurisdictions however the winnings paid in promotional external jackpots are not deductible for gaming tax purposes. This is because promotional jackpots do not offer the required fairness (statistically equal probability of win per unit bet for all players at all times, i.e. non-deterministic) to be considered tax deductible regulatory jackpots. A typical promotional jackpot uses simple deterministic triggering methods such that the jackpot is guaranteed to go off within a certain amount of turnover. Conventionally the implementation of

externally triggered regulatory jackpots has been difficult due to the requirement for non-deterministic behaviour. Furthermore meeting the regulatory jackpot requirements is difficult when the EGMs participating in the jackpot are of different denominations and/or offer a variety of bets (multi-line and/or ability to select number of credits to bet on each play) and also when the communications between the EGM and the external jackpot trigger do not guarantee play by play delivery of information.

Australian patent application AU1999434453 discloses a prize awarding system which addresses the problems experienced by the above non-deterministic jackpot systems.

In this patent application a random process is implemented with the desired statistical properties based on the actual occurrence of turnover. While such methods attempt to reduce computational load and critical timing requirements compared to jackpots that are triggered off specific plays of an EGM, there is still significant software complexity, computational load and real time requirements associated with these methods. In addition the actual statistical properties of the jackpot depend critically on details of the implementation and the system on which it runs. Verification of correct jackpot operation under all patterns of play and system load is time consuming and itself requires statistical analysis to interpret the results.

Another Australian patent number 589158 describes a system which consists of a number of poker machines producing an incrementing signal which is totalled by a counting means. A jackpot is triggered when the counting means reaches a predetermined value, with the jackpot being awarded to the machine that caused the increment to go over the trigger value. However the system described in this patent application has a number of drawbacks. Firstly the jackpot prize cannot be a fixed value. It is

always dependent upon the amount of turnover before the trigger value is reached by the counting means. In addition it is noted that the jackpot is triggered from a combined count from each of the EGMs.

In the above system the jackpot is triggered based on a uniform distribution for the random number which is used as the trigger value.

In addition, the random number range used must have a lower bound of the jackpot minimum display/prize value and an upper bound of the maximum desired display/prize value, leading to the situation that as the display value approaches, the maximum probability of the win inherently increases.

It would be desirable to produce an improved gaming system.

For convenience any game playing module, whether this be a mechanical device such as an electronic gaming machine or a graphical user interface appearing on a PC or similar linked to the internet or other communication network, will be referred to as a gaming console.

It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or in any other country.

SUMMARY OF THE INVENTION

According to one aspect of the present invention there is provided a method of awarding a prize in a gaming system including a plurality of game controllers comprising the steps of providing a trigger value derived from a random variable having a non-uniform distribution, periodically receiving count data from each game console, being data representing at least one parameter of a game console, calculating a total value representing the total count data received, comparing the total value with the trigger value, transmitting a prize instruction signal to an output means if the total value has a predetermined

relationship with the trigger value [and outputting from the output means the prize instruction signal to at least one game console], whereby the prize instruction signal results in at least one game console issuing a prize.

Preferably the non-uniform distribution is a geometric distribution.

Preferably the prize instruction signal is output from the output means to at least one game console.

The prize instruction signal may include a prize display signal and a game console signal for updating one or more of the game consoles.

It is preferred that the output means is connected to a display means which indicates that a prize has been won by the at least one game console.

The display means may include a sign, an audio visual indication or some other method which does not need to interact with the one game console.

Preferably the random variable is added to a predetermined offset value to produce the trigger value.

Preferably the offset value is calculated and stored in a memory location prior to addition to the random variable.

The random variable may have a distribution which is modified by a function to generate a value with a geometric distribution.

Preferably the function includes an inverse geometric distribution.

It is preferred that the prize is determined independently of the count data.

Preferably the prize instructions signal is output to one or more of the gaming consoles based on each gaming console from which count data was received which resulted in the total value having the predetermined relationship with the trigger value.

Therefore according to one example a particular combination or sequence of count data received from gaming consoles could result in the total value having the

predetermined relationship with the trigger value and this may result in more than one game console issuing a prize because they were part of the count data sequence required to produce the prize instruction signal.

Preferably the method includes storing the identity of each gaming console from which count data is received.

The method may include storing the identity of the trigger gaming console, being the gaming console from which count data is received which results in the total value having the predetermined relationship with the trigger value.

The method preferably includes outputting the prize instruction signal to one or more game consoles based on the identity of the trigger gaming console.

Preferably the method includes outputting the prize instruction signal to the/each trigger gaming console.

The method may include receiving count data from each gaming console.

Preferably the count data is collected synchronously with game play on each gaming console.

Alternatively count data is collected asynchronously with game play on one/more gaming consoles.

It is preferred that the comparing step is performed synchronously with playing one/more gaming consoles.

Alternatively the comparison step is performed asynchronously with playing the gaming console.

The comparing step may be performed synchronously with receiving count data.

Alternatively the comparing step may be performed asynchronously with receiving count data.

It is preferred that the predetermined relationship is that the total value is equal to the trigger value.

Alternatively the predetermined relationship is

that the total value is a multiple of the trigger value.

Alternatively the predetermined relationship is that the total value is related to the trigger value through a mathematical relationship.

According to another embodiment the predetermined relationship is that the total value is greater than the trigger value.

According to another embodiment the predetermined relationship is that the total value has a sequence of count data which matches the sequence of the trigger value. For example the trigger value could be one gaming console or a number of gaming consoles together producing a sequence of pay outs, symbols, or game plays such as three lines followed by five lines, followed by one line if the gaming consoles are configured by manufacturers to output signals indicative of this.

Preferably the count data represents one game played on one game console.

According to one embodiment the count data represents multiple games played on one game console.

Alternatively the count data represents one event occurring on one game console.

Alternatively the count data represents one event occurring on greater than one game console.

Alternatively the count data represents a predetermined number of games played on one or more gaming consoles.

Alternatively, the count data represents a predetermined amount of turnover occurring on one gaming console.

Preferably parameters of the count data include any one or more of the above recited alternatives relating to count data.

The parameters preferably include:

a predetermined amount of money spent/gambled on a gaming console.

a predetermined number of indicia arrangements on

a gaming console;

a predetermined combination of events on different gaming consoles;

each time a gaming console is played;

a predetermined turnover of gaming consoles or predetermined function of turnover.

Preferably the method includes the step of receiving count data from each gaming console in the gaming system.

The method may include gaming consoles which are electronic gaming machines, internet based gaming consoles visible on a computer screen, lotto type display screens, hardware based, software based or any combination thereof.

The method may also include loyalty systems and may therefore include transaction terminals such as those associated with EFTPOS or Visa. Every time a customer makes a transaction count data could be transmitted to a central console whereby a person has a chance of winning a jackpot in accordance with the invention broadly described above.

The gaming system may include a plurality of gaming consoles linked in a network or through remote communication means such as the internet.

The gaming system may include a controller, a trigger value generator, a jackpot triggering means and a display means separate from each gaming console.

Preferably the system includes a storage means for storing count data.

The method may include providing an accumulator for totaling the count data stored in the storage means.

The accumulator preferably is part of the storage means.

The method may include providing a controller to provide the random trigger value.

The method may include receiving count data each time a game console is played.

It is preferred that the offset is only needed to

achieve behaviour equivalent of that that would be obtained if the count was reset each time a new trigger value was picked from the random number generator. Thus, the trigger value may be derived according to anyone of the following options:

a. Adding the offset to the value obtained from the random number generator to obtain the trigger value;

b. Calculating a derived count equal to the raw count minus the offset and compare the derived count to a trigger value obtained directly from the random number generator; and

c. Resetting the count to zero every time a new trigger value is obtained directly from the random number source.

The random value may be calculated based on a parameter indicative of the probability of a win.

Preferably the total value represents the total number of games played on each game console.

The random value may be calculated to have a predetermined geometrical probability distribution.

Preferably the method includes at a predetermined time interval providing a new random trigger value.

The method may include providing a new random trigger value after at least one game controller issues a prize.

The method may include calculating a random value having one probability distribution and transforming the random value by a predetermined function to generate a random value with a different probability distribution.

Preferably the random value is not uniformly distributed.

The random value may be generated from a pseudo random number generator.

It is preferred that the trigger value is reset more frequently than once per output of the prize instruction signal to one/more game console.

The offset value may be set at the current total value.

The offset value and the random value may be selected and a trigger value reset whenever a prize instruction signal is sent to one or more predetermined game controllers.

It is preferred that count data is reset to a predetermined number such as 0 after a prize instruction signal is output.

Preferably the random value is recalculated after a prize instruction signal is output.

Preferably the random value is recalculated after the prize instruction signal is output whereby the trigger value is greater than the total value.

Preferably the predetermined prize includes one or more of money, extra games on a game console, calculated start up amount, a percentage of turnover from one/more game console.

The prize may be reset to a start up amount when the prize instruction signal is output.

According to another aspect of the present invention there is provided a controller for use in a gaming system, the controller comprising a trigger value, a generator for generating a random trigger value at predetermined times, a receiver for receiving count data, from each game console, being data representing at least one parameter of a game console, a calculating means for calculating a total value representing the total count data received by the receiver, a comparator for comparing the total value with the trigger value and a processor for outputting a prize signal to at least one game console if the total value has a predetermined relationship with the trigger value.

Preferably the processor is adapted to output a prize signal to the game console from which count data was received which resulted in the total value having the predetermined relationship with the trigger value.

Preferably the predetermined relationship may be one of the options previously defined.

Preferably the trigger value generator is adapted to periodically select a value of a random variable, calculate an offset value and add this to the random variable to produce the trigger value.

Preferably the trigger value is determined independent of turnover of the gaming system.

Preferably the random variable has a minimum value of 1.

According to another aspect of the present invention there is provided a gaming system comprising a plurality of game consoles, a trigger value generator for generating a trigger value, a prize triggering means, and a controller which is adapted to periodically receive count data from each game console, being data representing at least one parameter of a game console, calculate a total value representing the total count data received by the receiver and compare the total value with the trigger value and operate the prize triggering means to transmit a prize instruction signal to at least one game console if the total value has a predetermined relationship with the trigger value.

Preferably the controller is adapted to operate the prize trigger means to transmit the prize instruction signal to one of the game consoles from which count data was received which resulted in the total value having the predetermined relationship with the trigger value.

It is preferred that the gaming system includes one or more means for implementing one or more of the methods previously outlined.

According to one aspect of the present invention there is provided a method of awarding a prize in a gaming system including at least one game console comprising the steps of providing a random trigger value, periodically receiving count data from one game console, being data representing at least one parameter of the game console,

calculating a total value representing the total count data received, comparing the total value with the trigger value, transmitting a prize instruction signal to an output means if the total value has a predetermined relationship with the trigger value, whereby the prize instruction signal results in at least one game console issuing a prize.

It is preferred that the output means is connected to a display means which indicates that a prize has been won by the at least one game console.

The prize instruction signal may be sent to the one game console.

The display means may include a sign, an audio visual indication or some other method which does not need to interact with the one game console.

Preferably, the prize instruction signal includes a prize display signal and a game console signal for updating one or more of the game consoles.

According to one embodiment it is preferred that the system includes a single game console operating on its own or a number of game consoles linked through a communication network but each operating independently in accordance with the above method.

It is preferred that the random trigger value is derived from a random variable having a non-uniform distribution.

Preferably the method includes providing a plurality of random trigger values with each trigger value being associated with a respective gaming console.

According to one embodiment the method includes providing a plurality of random trigger values for a plurality of respective game consoles.

Preferably the method includes providing a plurality of count storage means for respectively receiving count data from respective game consoles and calculating a total value representing the total count data received respectively for each game console.

Preferably the method includes providing a jackpot trigger device which is adapted to transmit the prize instruction signal to the output means of any game console for which the total count data received has a predetermined relationship with the trigger value for that game console.

Preferably the method includes providing a jackpot prize calculator for determining the prize for any one of the game consoles if the total count data received and stored by the jackpot trigger device has the predetermined relationship with the trigger value for that game console.

Preferably the non-uniform distribution is a geometric distribution.

Preferably the random variable is added to a predetermined offset value to produce the random trigger value.

Preferably the offset value is calculated and stored in a memory location prior to addition to the random variable.

The random variable may have a distribution which is modified by a function to generate a value with a geometric distribution.

Preferably the function includes an inverse geometric distribution.

It is preferred that the prize is determined independently of the count data.

Preferably the count data is collected synchronously with game play on the gaming console.

Alternatively count data is collected asynchronously with game play on the gaming console.

It is preferred that the comparing step is performed synchronously with playing the gaming console.

Alternatively the comparison step is performed asynchronously with playing the gaming console.

The comparing step may be performed synchronously with receiving count data.

Alternatively the comparing step may be performed asynchronously with receiving count data.

It is preferred that the predetermined relationship is that the total value is equal to the trigger value.

Alternatively the predetermined relationship is that the total value is a multiple of the trigger value.

Alternatively the predetermined relationship is that the total value is related to the trigger value through a mathematical relationship.

According to another embodiment the predetermined relationship is that the total value is greater than the trigger value.

According to another embodiment the predetermined relationship is that the total value has a sequence of count data which matches the sequence of the trigger value. For example the trigger value could be one gaming console or a number of gaming consoles together producing a sequence of pay outs, symbols, or game plays such as three lines followed by five lines, followed by one line if the gaming consoles are configured by manufacturers to output signals indicative of this.

Preferably the count data represents one game played on one game console.

According to one embodiment the count data represents multiple games played on one game console.

Alternatively the count data represents one event occurring on one game console.

Alternatively the count data represents one event occurring on greater than one game console.

Preferably parameters of the count data include any one of the above recited alternatives relating to count data.

The parameters preferably include:

a predetermined amount of money spent/gambled on a gaming console.

a predetermined number of indicia arrangements on

a gaming console;

a predetermined combination of events on different gaming consoles;

each time a gaming console is played;

a predetermined turnover of one or more gaming consoles or predetermined function of turnover.

Preferably the method includes the step of receiving count data from each gaming console in the gaming system.

The method may include gaming consoles which are electronic gaming machines, internet based gaming consoles visible on a computer screen, lotto type display screens, hardware based, software based or any combination thereof.

The method may also include loyalty systems and may therefore include transaction terminals such as those associated with EFTPOS or Visa. Every time a customer makes a transaction count data could be transmitted to a central console whereby a person has a chance of winning a jackpot in accordance with the invention broadly described above.

The method may include providing a gaming system with a plurality of gaming consoles linked in a network or through remote communication means such as the internet.

The gaming system may include a controller, a trigger value generator, a jackpot triggering means and a display means separate from each gaming console.

Preferably the system includes a storage means for storing count data.

The method may include providing an accumulator for totalling the count data stored in the storage means.

The accumulator preferably is part of the storage means.

The method may include providing a controller to provide the random trigger value.

The method may include receiving count data each time one game console is played and storing the count data in a dedicated memory for the associated game console.

Preferably the method includes calculating the trigger value by adding a random value to an offset value.

It is preferred that the offset is only needed to achieve behaviour equivalent of that that would be obtained if the count was reset each time a new trigger value was picked from the random number generator. Thus, the trigger value may be derived according to anyone of the following options:

a. Adding the offset to the value obtained from the random number generator to obtain the trigger value;

b. Calculating a derived count equal to the raw count minus the offset and compare the derived count to a trigger value obtained directly from the random number generator; and

c. Resetting the count to zero every time a new trigger value is obtained directly from the random number source.

The random value may be calculated based on a parameter indicative of the probability of a win.

The random value may be calculated to have a predetermined geometrical probability distribution.

Preferably the method includes at a predetermined time (including occasion) providing a new random trigger value.

The method may include providing a new random trigger value for one game console after a prize is issued to that game console.

The method may include calculating a random value having one probability distribution and transforming the random value by a predetermined function to generate a random value with a different probability distribution.

Preferably the function is an inverse distribution.

Preferably the random value is not uniformly distributed.

The random value may be generated from a pseudo

random number generator.

It is preferred that the trigger value is reset more frequently than once per output of the prize instruction signal to the game controller.

The offset value may be set at the current total value.

The offset value and the random value may be selected and a trigger value reset whenever a prize instruction signal is sent to the game console.

It is preferred that count data is reset to a predetermined number such as 0 after a prize instruction signal is output.

Preferably the random value is recalculated after a prize instruction signal is output.

Preferably the random value is recalculated after the prize instruction signal is output whereby the trigger value is greater than the total value.

Preferably the predetermined prize includes money, extra games on a game console, calculated start up amount plus a percentage of turnover from the game console.

Preferably the prize incorporates a percentage of turnover from one or more game consoles.

Preferably the value of the prize awarded is determined as a start up amount plus a percentage of turnover from the game console.

Preferably, the game console is an EGM.

The value of the prize awarded may be determined by some additional game of chance offered to the player of the EGM when the prize instruction signal is output.

According to one embodiment of the invention the method is implemented in software running on a jackpot trigger device networked to one or more EGM's.

The method may be implemented in software running on a jackpot triggering device connected to or forming part of a single EGM.

The prize may be reset to a start up amount when

the prize instruction signal is output.

According to another aspect of the present invention there is provided a controller for use in a gaming system, the controller comprising a generator for generating a random trigger value at predetermined times, a receiver for receiving count data, one game console, being data representing at least one parameter of the game console, a calculating means for calculating a total value representing the total count data received by the receiver, a comparator for comparing the total value with the trigger value and a processor for outputting a prize signal to the one game console if the total value has a predetermined relationship with the trigger value.

Preferably the trigger value generator is adapted to select a value of a random variable, calculate an offset value and add this to the random variable to produce the trigger value.

Preferably the trigger value is determined independent of turnover of the gaming system.

Preferably the random variable has a minimum value of 1.

Preferably a master controller incorporates a plurality of the controllers.

According to another aspect of the present invention there is provided a gaming system comprising at least one game console, a trigger value generator for generating a trigger value, a prize triggering means, and a controller which is adapted to periodically receive count data from one game console, being data representing at least one parameter of each game console, store count data for each game console in a different memory location, calculate a total value representing the total count data received by the receiver for each game console and compare the total value for each game console with the trigger value and operate the prize triggering means to transmit a prize instruction signal to the gaming console which has a total value having a predetermined relationship with the

trigger value.

Preferably the trigger value generator comprises a plurality of trigger values each associated with a respective one of the game consoles.

It is preferred that the gaming system includes one or more means for implementing one or more of the methods previously outlined.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the present invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 shows a schematic representation of a gaming system according to a preferred embodiment of a first aspect of the present invention;

Figure 2 shows the gaming system according to a second embodiment of the first aspect of the present invention; and

Figure 3 shows a flow diagram of the gaming system according to the preferred embodiment of the first aspect of the present invention.

Figure 4 shows a schematic representation of a gaming system according to a preferred embodiment of a second aspect of the present invention;

Figure 5 shows the gaming system according to a second embodiment of the second aspect of the present invention; and

Figure 6 shows a flow chart for the gaming system in accordance with the preferred embodiment of the second aspect of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 shows a gaming system 10 having three EGMs 11, 12, 13 which are linked to a gaming system controller 14. This gaming system controller 14 consists of a site controller device 15, a jackpot trigger device 16 and a jackpot prize calculator 17.

An overhead display 18 is also provided above each of the EGMs 11, 12, 13.

In operation the site controller 15 receives meter information from each of the EGMs over a communications network such as that utilising fibre optics, ethernet or RS485. In this embodiment the meter information includes a meter representing the cumulative turnover of the gaming machine since it was commissioned.

The site controller monitors and stores the latest value of the EGM meters and in particular the turnover meter.

The site controller sends the latest turnover meter value for each EGM to the jackpot trigger device 16.

An accumulator located in the jackpot trigger device stores a turnover meter value for each EGM.

In addition the jackpot trigger device calculates a total accumulated value representing total meter turnover value for all of the EGM's 11, 12, 13.

Each time any one of the meter values is incremented, the site controller passes on this incremental change to the jackpot trigger device which in turn recalculates the total accumulated value. In addition total meter values are stored for each EGM, being a meter value to date. Thus the jackpot trigger device records the total turnover value of the gaming system at any particular instant as well as the total turnover value for each machine at any instant.

The jackpot trigger device also stores a jackpot trigger value which it calculates.

A comparator in the jackpot trigger device compares the current total accumulated value with the trigger value and if the total has reached or exceeded the trigger value the jackpot trigger device outputs a jackpot win signal to the EGM from the which the last incremented count value was received by the site controller and which resulted in the total accumulated value equaling or exceeding the trigger value.

In one situation the jackpot win would be awarded by the jackpot trigger device when the total accumulated

value was equal to the trigger value. However, in some circumstances the total accumulated value would have to exceed the trigger value in order for the jackpot trigger device to award a jackpot win.

When the jackpot trigger device outputs a jackpot win signal this is transmitted to the winning EGM as well as to the overhead display device 18. This results in an appropriate display on both the winning EGM and the overhead display for the purposes of indicating the jackpot win.

The jackpot trigger value is calculated in a random selection process.

Typically the jackpot prize calculator obtains a random value from a random number generator based on an appropriate probability distribution. For the purposes of this embodiment a uniform distribution is used. The result is then modified by an inverse distribution function to give the desired geometric distribution.

According to the preferred embodiment the random number generator follows a geometric distribution model. Thus if the random generator has a discreet ransom variable X to follow a geometric distribution with a probability parameter P between 0 and 1, the trials must meet the following requirements:

a. The total number of trials is potentially infinite;

b. There are just two outcomes of each trial success and failure;

c. The outcomes of all the trials are statistically independent; and

d. All the trials have the same probability of success.

In this embodiment the geometric distribution has the desirable property that the resulting probability of a win per unit of turnover is constant. In probability terms each unit of turnover is considered a trial and hence P is set to the desired probability of win per unit

of turnover. The result from the random number generator is added to a turnover offset value to give the jackpot trigger value.

As shown in Figure 3 the system may incorporate software and/or hardware which controls operation of each of the EGM's and issuing of a jackpot prize. Initially at system start up in step 25, the total turnover for the system is set to zero in step 26. In step 27 and in step 28 the site controller polls each EGM to receive the latest turnover value of each EGM's turnover meter. The value for each EGM turnover meter is then added to a total turnover meter located in the jackpot trigger device.

The jackpot trigger device in step 29 calculates a random value which is based on the value from a random source transferred to have a geometric distribution. The trigger value is then calculated in step 30 by adding the random value to the total turnover value as received from the total turnover meter.

Once the turnover meter values have been received from each EGM the total turnover meter of the jackpot trigger device has been fully updated and in step 31 updating of this meter is completed. In step 32 if there is a change in the meter value of any EGM this is passed onto the site controller which in step 33 sets a new turnover value for the total turnover meter.

In a typical polling method of ascertaining the meter value for each EGM, in step, 34 if polling results in the previous turnover for an EGM equaling the new turnover, then the total turnover meter updating is complete. If however the previous turnover does not equal the new turnover then the new value for the total turnover meter is set to a total turnover value currently stored minus the previous turnover for the EGM plus the new turnover in step 35. This means that if there has been an incremental increase in the turnover meter this is added to the total turnover value.

In step 36 the total turnover value is then

compared to the trigger value and if it does not exceed the trigger value then updating is complete, however if the total turnover value is greater than or equal to the trigger value then a signal is transmitted from the jackpot trigger device to the winning EGM enabling a jackpot win to be displayed in step 37. This results in resetting of the trigger value by recalculation of the random value as previously described in relation to steps 29 and 30.

Because the trigger value is randomly selected it is theoretically possible for any person playing one of the EGMs 11, 12, 13 to win a jackpot at any time regardless of the amount of turnover generated by the EGMs. However because knowledge of the trigger value allows prediction of when the next win will occur it is important that this trigger value remains secret.

If there is a security risk and at a particular time someone is able to work out the trigger value, one option is to periodically change the trigger value so that the security breach would have to occur consistently to know whether the trigger value had changed.

Whenever the jackpot trigger device awards a jackpot by sending an appropriate signals to the EGMs, the trigger value is reset and the jackpot trigger device and the jackpot prize calculator calculates a new trigger value and sends this to the jackpot trigger device.

In figure 2 a gaming system is shown consisting of separate groups of gaming machines in different locations. Thus one group of gaming machines 20 may be located at one premises and one group of gaming machines may be located at a different premises.

Each group of gaming machines would have a site controller and jackpot trigger device 22, 23 and would be linked through a communication system to a central controller 24 which is able to provide the trigger value.

The same or different trigger values may be sent to each group of EGMs at the different premises.

Alternatively a central jackpot trigger device may be located at the central control station 24 so that each group of gaming machines may be linked together to allow a larger jackpot prize to be awarded. This set up would have the advantage of increased security as trigger value setting and comparison with total accumulated turnover value would be calculated off site.

In this embodiment the local jackpot trigger device would have the main function of issuing the jackpot signal to the appropriate machine(s). The preferred embodiment has been described for a gaming system incorporating a number of gaming machines. However, the invention is equally applicable to a single gaming machine and how it offers a jackpot prize. Thus Figure 1 would be modified to show a single EGM with the remaining components the same. Therefore the site controller would simply receive metering information regarding the number of times the EGM is played and this would be sent to the jackpot trigger device. When the total accumulated value equaled or exceeded the trigger value, a jackpot would be awarded to the EGM.

Generally a jackpot triggering device will be networked to multiple EGMs. However in the networking example of Figure 2 multiple jackpot triggering devices may be networked to a single jackpot prize calculator device.

The jackpot prize calculator can be omitted if the prize amount is fixed.

For a so-called progressive jackpot, the jackpot prize calculator device calculates the prize value from a start up amount and a percentage of the amount bet on participating EGMs. If there is only a single jackpot triggering device it may be combined with the jackpot prize calculator device to form a self-contained jackpot controller.

Where the gaming system includes a monitoring device for a site or group of machines, this site

controller device and the jackpot trigger device may also advantageously be combined as a single unit. The system may also incorporate the feature of separate in machine displays to provide additional capabilities including a feature game, the outcome of which determines the prize awarded to the winning player.

It is preferred that the preferred embodiment of the present invention has at least one of the following advantages:

i. The jackpot prize/display may be fixed value.

ii. The jackpot does not have to be triggered off the combined count from a number of EGMs. Instead a subset of the combined EGMs is able to independently trigger the jackpot win.

iii. The rate or time at which the count is updated need not have any impact on the win statistics and need not be the same for each EGM. This would be of particular advantage when using a jackpot triggering device which communicates with the actual gaming machines over a network.

iv. The statistical properties of the system can be tailored to meet market regulatory or other requirements. In particular a non-deterministic jackpot offering a constant probability of win per unit bet can be implemented using this apparatus.

v. Other novel win distributions can be generated using the same system. For example, a distribution with a high probability of win around its mean value and a very low probability of win for low and high values would reduce the variance in the win amount for a progressive jackpot, and in the frequency of wins, reducing the risk of either frequent or high valued wins to the jackpot operator. Conversely, a distribution with a high probability of win for small and large values, would give additional player excitement due to its tendency to have periods of frequent wins interspersed

with the progressive prize reaching a high value.

vi. In contrast to other non-deterministic jackpot triggering methods the win decision can be made instantaneously. The win decision does not inherently lag behind turnover as it does in systems using a time window, which must use a very short time window, increasing computation of load, and/or having additional complexity to deal with "deferred" or "pending" wins or otherwise prevent "walk away".

vii. Timing precision is not required to obtain correct win probability.

Based on the above it is apparent that changes and modifications may be made to each of the embodiments described. In particular the particular parameters of an EGM or group of EGMs that is recorded/received by the site controller and transferred to the jackpot triggering device can be quite varied. Therefore a cumulative turnover value may be recorded and compared with a trigger value or count values indicative of the number of times one or more of the EGMs is played. Furthermore, the parameters of the EGMs which can be monitored include those relating to the arrangement of symbols appearing in the display as well as predetermined sequences of events such as minor prizes being issued.

Figure 4 shows a gaming system 110 having three EGMs 111, 112, 113 which are linked to a gaming system controller 114. This gaming system controller 114 consists of a site controller device 115, a jackpot trigger device 116 and a jackpot prize calculator 117.

An overhead display 118 is also provided above each of the EGMs 111, 112, 113.

In operation the site controller 115 receives meter information from each of the EGMs over a communications network such as that utilising fibre optics, ethernet or RS485. In this embodiment the meter information includes a meter representing the cumulative turnover of the gaming machine since it was commissioned.

The site controller monitors and stores the latest value of the EGM meters and in particular the turnover meter.

The site controller sends the latest turnover meter value for each EGM to the jackpot trigger device 116.

An accumulator located in the jackpot trigger device stores a turnover meter value for each EGM.

Each time any one of the meter values is incremented total meter values are stored for each EGM, being a meter value to date. Thus the jackpot trigger device records the total turnover value for each machine at any instant.

The jackpot trigger device also stores a jackpot trigger value which it calculates.

A comparator in the jackpot trigger device compares the current total meter value for each EGM with the trigger value and if the total has reached or exceeded the trigger value the jackpot trigger device outputs a jackpot win signal to the EGM from the which the last incremented count value was received by the site controller and which resulted in the total meter value equalling or exceeding the trigger value.

In one situation the jackpot win would be awarded by the jackpot trigger device when the total meter value was equal to the trigger value. However, in some circumstances the total meter value would have to exceed the trigger value in order for the jackpot trigger device to award a jackpot win.

When the jackpot trigger device outputs a jackpot win signal this is transmitted to the winning EGM as well as to the overhead display device 118. This results in an appropriate display on both the winning EGM and the overhead display for the purposes of indicating the jackpot win.

The jackpot trigger value is calculated in a random selection process.

The trigger value for an EGM is calculated by the jackpot trigger device.

The jackpot trigger device receives from the site controller the latest value of the EGMs turnover meter as the turnover offset value. The jackpot trigger device then obtains a random value from an appropriate distribution. Typically a random number generator with a uniform distribution is used and the result is modified by an inverse distribution function to give the desired distribution. While any distribution may be used the geometric distribution has the desirable property that the resulting probability of win per unit of turnover is constant.

According to the preferred embodiment the random number generator follows a geometric distribution model. Thus if the random generator has a discrete random variable X, to follow a geometric distribution with a probability parameter P between 0 and 1, the trials must meet the following requirements:

a. The total number of trials is potentially infinite;

b. There are just two outcomes of each trial success and failure;

c. The outcomes of all the trials are statistically independent; and

d. All the trials have the same probability of success.

In probability terms each unit of turnover is considered a trial and hence P is set to the desired probability of win per unit of turnover. The result from the random number generator is added to a turnover offset value to give the jackpot trigger value.

As shown in Figure 4 for each EGM in the gaming system, after system start up shown as item 125, for each EGM in step 126, the random value is calculated in step 27 and the trigger value is calculated from the received random value and the current turnover value of the EGM in

step 128.

Startup processing is complete when the trigger values have been calculated for all EGMs and processing exits via step 129. Then, when an EGM turnover update message is received from an EGM in step 130 the new value of turnover for the EGM is extracted from the message in step 131.

In step 132 this turnover value is compared with the trigger value. If the turnover value is not greater than the trigger value no jackpot signal is issued whereas if the turnover value is greater than or equal to the trigger value the jackpot trigger device issues the win signal to the winning EGM in step 133 and in step 133 calculates a new trigger value based on a new random value and the old trigger value of the EGM in step 134.

Typically the flow chart is implemented using software by the combined site controller jackpot triggering device and jackpot prize calculator. The site controller continually poles each EGM for latest meter data and the jackpot trigger device stores total turnover/meter values for each EGM in the manner previously described.

In the above system separate trigger values are calculated for each EGM so that each EGM is played to reach a target turnover value which is greater than or equal to a different trigger value.

Because the trigger value is randomly selected it is theoretically possible for any person playing one of the EGMs 111, 112, 113 to win a jackpot at any time regardless of the amount of turnover generated by the EGMs. However because knowledge of the trigger value allows prediction of when the next win will occur it is important that this trigger value remains secret.

If there is a security risk and at a particular time some one is able to work out the trigger value one option is to periodically change the trigger value so that the security breach would have to occur consistently to

know whether the trigger value had changed.

Whenever the jackpot trigger device awards a jackpot by sending an appropriate signals to the EGMs, the trigger value is reset and the jackpot trigger device and the jackpot prize calculator calculates a new trigger value and sends this to the jackpot trigger device.

In figure 5 a gaming system is shown consisting of separate groups of gaming machines in different locations. Thus one group of gaming machines 120 may be located at one premises and one group of gaming machines may be located at a different premises.

Each group of gaming machines would have a site controller and jackpot trigger device 122, 123 and would be linked through a communication system to a central controller 124 which is able to provide the trigger value.

The same or different trigger values may be sent to each group of EGMs at the different premises.

Suitable encryption/decryption methods can be utilised in order to provide security for the trigger value. In this embodiment each group of gaming machines could have appropriate decryption/encryption capabilities to identify the actual trigger value transmitted from the central controller 124.

Alternatively a central jackpot trigger device may be located at the central control station 124 so that each group of gaming machines may be linked together to allow a larger jackpot prize to be awarded. This set up would have the advantage of increased security as trigger value setting and comparison with total accumulated turnover value would be calculated off site.

In this embodiment the local jackpot trigger device would have the main function of issuing the jackpot signal to the appropriate machine(s). The preferred embodiment has been described for a gaming system incorporating a number of gaming machines. However, the invention is equally applicable to a single gaming machine and how it offers a jackpot prize. Thus Figure 4 would be

modified to show a single EGM with the remaining components the same. Therefore the site controller would simply receive metering information regarding the number of times the EGM is played and this would be sent to the jackpot trigger device. When the total accumulated value equalled or exceeded the trigger value, a jackpot would be awarded to the EGM.

Generally a jackpot triggering device will be networked to multiple EGMs. However in the networking example of Figure 5 multiple jackpot triggering devices may be networked to a single jackpot prize calculator device.

The jackpot prize calculator can be omitted if the prize amount is fixed.

For a so-called progressive jackpot, the jackpot prize calculator device calculates the prize value from a start up amount and a percentage of the amount bet on participating EGMs. If there is only a single jackpot triggering device it may be combined with the jackpot prize calculator device to form a self-contained jackpot controller.

Where the gaming system includes a monitoring device for a site or group of machines, this site controller device and the jackpot trigger device may also advantageously be combined as a single unit. The system may also incorporate the feature of separate in machine displays to provide additional capabilities including a feature game, the outcome of which determines the prize awarded to the winning player.

It is preferred that the trigger value for an embodiment incorporating a single EGM is calculated by utilising the jackpot trigger device to use the latest value of the EGMs turnover meter as received from the site controller as the turnover offset value. The jackpot trigger device then obtains a random value from an appropriate distribution. The procedure is then similar to that previously described for multiple EGMs.

It is preferred that the preferred embodiment of the present invention has at least one of the following advantages:

i. The jackpot prize/display may be fixed value.

ii. The jackpot does not have to be triggered off the combined count from a number of EGMs. Instead each EGM is able to independently trigger the jackpot win.

iii. The rate or time at which the count is updated need not have any impact on the win statistics and need not be the same for each EGM. This would be of particular advantage when using a jackpot triggering device which communicates with the actual gaming machines over a network.

iv. The statistical properties of the system can be tailored to meet market regulatory or other requirements. In particular a non-deterministic jackpot offering a constant probability of win per unit bet can be implemented using this apparatus.

v. Other novel win distributions can be generated using the same system. The system would allow the conditions under which the starting point of the distribution (i.e. the offset or base value to which the random value is added) to be recalculated and a new random value selected to be chosen according to the desired behaviour of the individual jackpot as well as allowing the distribution of wins from that point to be chosen. In the embodiment where there is a uniform probability of win per cent bet, the frequency and conditions under which this reselection occurs would make no difference to the behaviour of the jackpot. In other embodiments where the distribution is not uniform, changing from a system where the selection occurs whenever any EGM wins the jackpot to a system where the selection occurs only when the individual EGM wins the jackpot, gives quite different behaviour. With the former embodiment turnover counting can be avoided.

vi. In contrast to other non-deterministic jackpot triggering methods the win decision can be made instantaneously. The win decision does not inherently lag behind turnover as it does in systems using a time window, which must use a very short time window, increasing computation of load, and/or having additional complexity to deal with "deferred" or "pending" wins or otherwise prevent "walk away".

vii. Timing precision is not required to obtain correct win probability.

Based on the above it is apparent that changes and modifications may be made to each of the embodiments described. In particular the particular parameters of an EGM or group of EGMs that is recorded/received by the site controller and transferred to the jackpot triggering device can be quite varied.